



Department of Public Works – Wastewater Division
70 Letchworth Avenue, North Billerica, Massachusetts 01862
PH: (978) 671-0956 FAX: (978) 671-1305

Fred Russell, Director
Jeff Kalmes, Superintendent
April Munro, Pre-Treatment Coordinator

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Mr. Justin Pimpare
Regional Pretreatment Coordinator
EPA New England
5 Post Office Square
Suite 100 PEP 06-03
Boston, Massachusetts 02109

Mr. Kevin Brander
Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Northeast Regional Office
205B Lowell Street
Wilmington, MA 01887

Subject: **NPDES Permit MA0101711**
Billerica, Massachusetts Wastewater Treatment Facility
Industrial Pretreatment Annual Report - Calendar Year 2021

Gentlemen:

The Town of Billerica, Massachusetts, is submitting the following “Industrial Pretreatment Annual Report” for the Billerica Wastewater Treatment Facility (WWTF) for the calendar year 2021. I have prepared this report in accordance with Part I.E.3 and Attachment C of the Town’s NPDES permit. The numbered responses below correspond to the items listed in Attachment 1 and 2 and Tables 1 through 4.

1. Attachment 1 presents an updated list of all Industrial User Permits by category, and indicates compliance status with regard to semi-annual and annual monitoring reports, categorical standards, and local limits.

There are currently 25 Industrial User (IU) Permits: five (5) categorical (CIUs), eight (8) Significant IUs (SIUs), ten (10) IUs, and two (2) zero discharge (ZD) users. During this period:

six (6) IUs were re-permitted: Nova Biomedical, Lantheus Medical Imaging, Entrgris, Magellan Diagnostics, & Proterix.

Two (2) new IUs were permitted: Boston Materials,& KS Partners.

Six (6) IU permit renewals upcoming in early 2022: Pace Industries, Baker Commodities, AOTCO Metal Finishing, Bruker Biospin, Quanterix, & Nuvera Fuel Cells.

2. Attachment 1 also summarizes **compliance and enforcement** activities during the calendar year 2021. These activities included:
 - IU/SIU/CIUs inspected and sampled.
 - Written Notices of Violation (NOVs) issued (10).

- Written Notices of Non-compliance (NONs) issued (2).

The Town issued 11 Compliance Orders / Schedules and Violations in 2021 as noted in Attachment 1 and listed below.

- One IU was fined five (5) times for high BOD. The IU had to repair their DAF System, and Polymer system, and changes were also made to their permit which required more frequent testing, and more analyses.
- One IU was fined for high BOD twice (2). The IU completed a new wastewater process upgrade, and required weekly BOD testing (from previous BOD issues from 2020).
- One IU was fined for high Cyanide twice (2), resample and retested. System is now being inspected by an outside lab to determine cyanide contamination.
- One IU was fined for high permit flow this summer. More frequent reporting is required.
- One IU was fined high cyanide. Resample and retest proved a result under local limits.

All IU/CIU/SIUs are currently in compliance.

The Town of Billerica did not issue Administrative Orders or file criminal or civil suits against any IUs in 2021.

3. During the calendar year 2021, there were no incidents of Significant Non-Compliance (SNC) at any industries and therefore no industries were published in a local paper. We used the U.S. EPA's recommended "rolling quarters" method to determine SNC for permit violations.

4. The Town's Industrial Pretreatment Program (IPP) has been effective in monitoring IUs and enforcing IPP requirements. Woodard and Curran assisted the Town, with IPP tasks. The Town does not anticipate any changes in funding or statutory authority.

5. The Town submitted proposed **Local Limits** to the EPA in July 2016.

- The new Local Limits were approved and became effective January 6, 2020.
- The Town of Billerica website Sewer Rules and Regulations were updated.
- There are now separate page look ups for Appendix A: Summary of Costs & Fees and Appendix D: Local Limits" on the Town of Billerica website.
- The updated Appendix A and D was reviewed with every IU.
- Appendix A and D hard copies are now attached to each IU Permit.
- The LINKOS IU Data programs were updated with the January 6, 2020 Local Limits.

6. In 2021, the Billerica WRRF did extensive sampling and analysis beyond its NPDES permit sampling requirements. This included acute and chronic toxicity sampling and analysis in March, June, September, and December 2021. In addition, WRRF staff obtained final effluent samples for total aluminum analysis on a monthly basis. Analytical reports for all of the sampling mentioned herein are available, and can be provided at your request.

In March 2021, the Town also completed an influent scan for priority pollutant metals and an effluent scan for all priority pollutants (Table 1). For this sampling, the Town used an automated sampler to obtain flow representative composite samples over a 24-hour period and obtained grab samples for volatile organics analyses. Table 2 summarizes the metal concentrations that were part of the pollutant scans. The acute and chronic toxicity sampling and analysis in 2021 included analysis for a number of heavy metals in the final effluent. Table 1 summarizes these concentrations.

Table 1
Metals Concentrations in Billerica WWTF Influent and Effluent

Parameter	Influent Concentration 3/12/2021	Effluent Concentration 6/12/2022	Reporting Limit
a.) Cadmium	0.2	0.1	0.1
b.) Chromium	5	2	1.0
c.) Copper	29.5	4.3	1.0
d.) Lead	1.9	BDL	0.5
e.) Mercury	BDL	BDL	0.2
f.) Nickel	3	2	1.0
g.) Silver	BDL	BDL	1.0
h.) Zinc	73	24	2.0
i.) Cyanide	BDL	BDL	10.0
j.) Arsenic	BDL	BDL	2.0

BDL = Below Detection Limit. NT= Not Tested
Concentrations are micrograms/liter (ug/L), for the total form of the metals
Influent and Effluent data is from composite samples collected at the WWTF on March 11 through March 12, 2021.

Table 2
Metals Concentrations in WWTF Effluent Obtained for Toxicity Tests

Parameter	3/12/2021	6/14/2021	9/21/2021	12/14/2021	Reporting Limit
Aluminum	255	167	146	788	10
Calcium	NT	NT	NT	NT	5
Copper	4.9	4.1	2.8	5.2	1
Lead	BDL	BDL	BDL	BDL	0.3
Nickel	2	2	2	2	1
Magnesium	NT	NT	NT	NT	5
Zinc	24	22	16	26	2

BDL = Below Detection Limit. Concentrations are ug/L, for the total form of the metal or cyanide.
NT = Not Tested

Of the metals detected in the influent in 2021 (Table 3), all parameter concentrations were below the maximum allowable influent concentrations to protect the activated sludge and nitrification processes, and for meeting Massachusetts Department of Environmental Protection (MassDEP) Type I standards (Table 4). Sludge is hauled offsite to a landfill, incinerated, and/or land applied. The Type I sludge quality criteria are presented here for comparison purposes only.

Table 3
Comparison of Detected Influent Pollutant Concentrations with
Threshold Inhibitory Concentrations and Allowable
Influent Concentrations for MassDEP Type I Sludge

Parameter	Maximum Detected Influent Concentration* 3/12/2021	Activated Sludge Max. Allowable Influent Concentration*	Nitrification Max. Allowable Influent Concentration*	Type I Sludge Max. Allowable Influent Concentration*
Chromium	5	1,400	340	430
Copper	29.5	1,600	82	450
Nickel	3	1,200	290	390
Zinc	73	630	210	1,700

Concentrations are ug/L, for the total form of the metal. Maximum allowable influent concentrations are those contained in the Billerica, MA *Local Limits Analysis Report – Final Report*, October 1994, Fay, Spofford & Thorndike, Inc.

Aluminum was also detected in the influent but is not shown in Table 3 because neither the 1987 EPA Guidance Manual used to develop the Town's local limits nor the 2016 EPA Local Limits Development Guidance contained data on this metal's inhibitory concentrations in treatment processes.

Total aluminum, copper, nickel and zinc were detected in the final effluent samples. The detected concentrations of copper, and zinc were each far less than the water quality standards, with river water dilution (Table 4). The concentration of total aluminum in the effluent was below the water quality standard for acute toxicity, with dilution, in all samples however one of the samples exceeded for chronic toxicity with dilution.

In August 2019 the WRRF received an interim NPDES permit limit of 333 ug/L Aluminum for the Final Effluent. The major sources of aluminum at the WRRF are from the alum sludge that the plant receives from the Billerica Water Treatment Facility, and from the addition of aluminum salts that are added at the WRRF just before the aeration tanks and in the distribution box ahead of the final clarifiers, to reduce phosphorus in the final effluent.

Table 4
Comparison of Detected Effluent Pollutant Concentrations with Water Quality Standards**

Sample Date/Standard	Aluminum	Copper	Nickel	Zinc
3/22/2021	255	4.9	2	24
6/14/2021	167	4.1	2	22
9/21/2021	146	2.8	2	16
12/14/2021	788	5.2	2	28
Acute Toxicity Concentration*	750	8.5	740	61
Diluted Acute Toxicity Conc.	4,125	45.1	4,070	335
Chronic Toxicity Concentration*	87	6.1	82	55
Diluted Chronic Toxicity Conc.	478	33.5	440	302

*Concentrations are ug/L, for the total form of the metal or cyanide. With the exception of aluminum, acute and chronic toxicity concentrations are those contained in the Billerica, MA *Local Limits Analysis Report – Final Report*, October 1994, Fay, Spofford & Thorndike, Inc.; aluminum toxicity concentrations are those contained in the Federal Register, Vol. 63, No. 234, December 7, 1998, page 67554. *The dilution factor used for combining the effluent with the Concord River water is 5.5, which is the ratio of the 7Q10 river flow plus the 12-month average daily WRRF flow for 2021 divided by this average daily flow, or (20.8 + 4.6 mgd)/4.6 mgd).*

BDL = Below Detection Limit

NS = Not Sampled

** This analysis excludes calcium and magnesium.

7. In 2021 there were no known incidents of pass-through at the treatment plant.

To detect interference and pass-through, the IPP Coordinator conducts the following tasks:

- Monitors, Inspects, and Samples all active IUs.
- Reviews all annual, semi-annual, monthly, and other monitoring reports submitted by IUs.
- Communicates with WRRF staff regarding daily laboratory analyses completed at the WRRF to identify potential problems from IUs.
- Communicates with the WRRF Superintendent concerning analyses completed by certified laboratories for quarterly effluent toxicity testing.

8. Over the past year the Town of Billerica issued a total of eleven (11) NONs / NOVs to industries that were in non-compliance. The items from these NONs / NOVs were all completed in 2021.

9. EPA approved the latest local limits that became effective January 6, 2020.

Attachment 2 includes the EPA Region I Annual Pretreatment Report Summary Sheet – December 2021, which summarizes much of the information presented in this report.

This concludes the **2021 Industrial Pretreatment Annual Report** for the Town of Billerica WRRF. We would be pleased to provide you with more information if needed.

Regards,

April Munro,
Industrial Pretreatment Coordinator
Town of Billerica
Public Works Department

Cc w/ encl.: MassDEP, Bureau of Waste Prevention, Industrial Wastewater Section
Mr. Frederick Russell, Billerica DPW Director
Mr. Jeff Kalmes, Superintendent, Billerica WRRF
Ms. Lauren Frank, Woodard & Curran

Attachments:

1. Industrial User Summary for Calendar year 2021.
2. EPA Region 1 Annual Pretreatment Summary Sheet – Calendar year 2021.